EUMETSAT Polar and GEO Programmes and Services

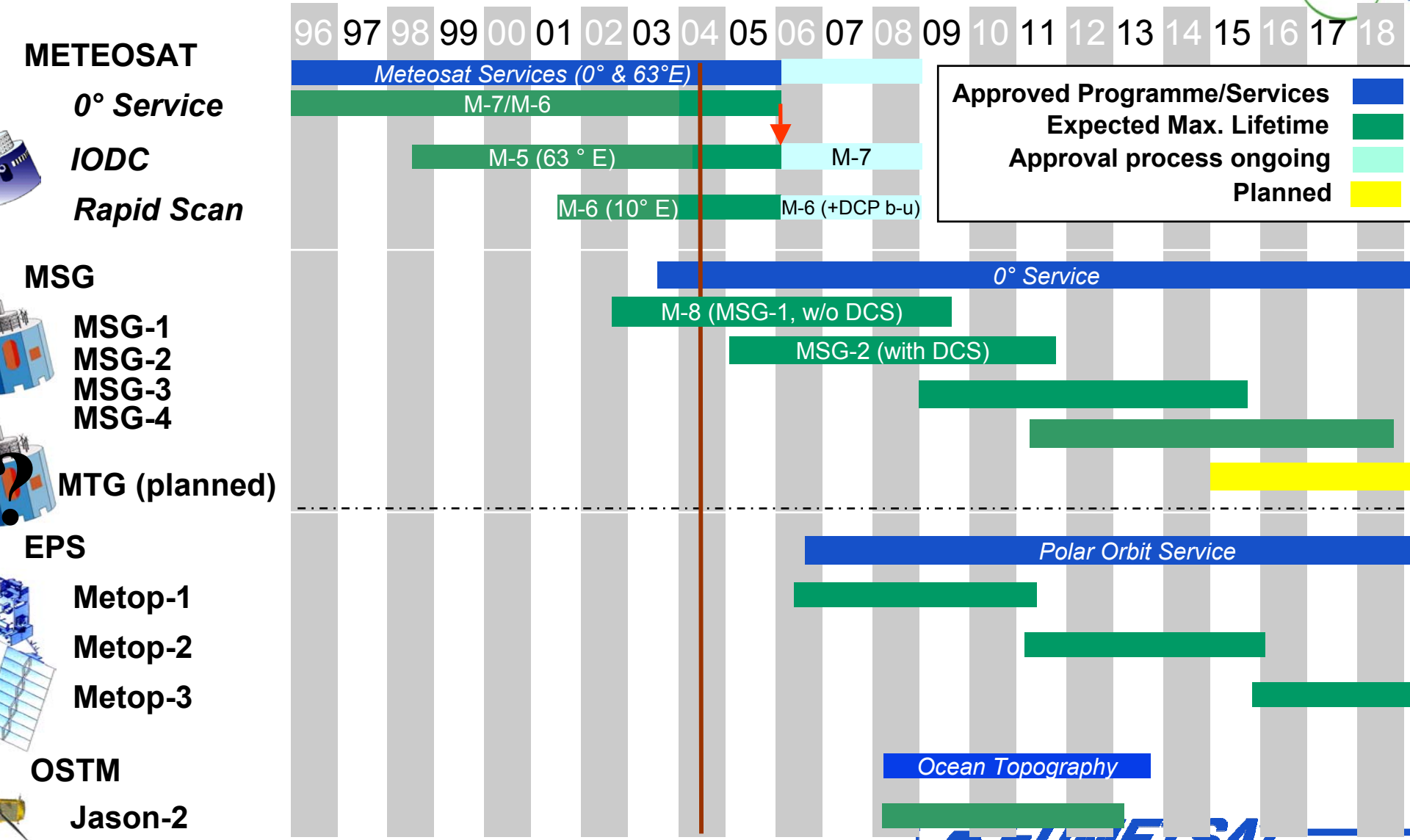
Ken Ashworth

EUMETSAT Representative to NOAA, Washington

EUMETSAT Highlights

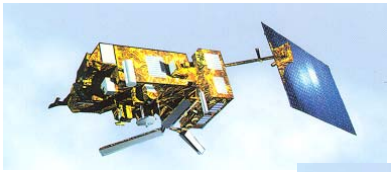
- Overview of EUMETSAT Programmes
- EUMETSAT Polar System, part of IJPS
- EUMETSAT ATOVS Re-transmission Service (EARS), EUMETCast
- Jason-2 Ocean Surface Topography Mission

Overview Of EUMETSAT Programmes

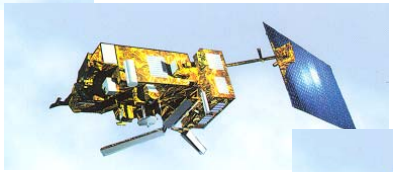


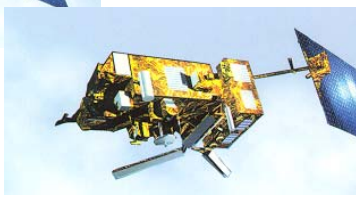
EPS Programme Overview

3 Launch services (Soyuz)

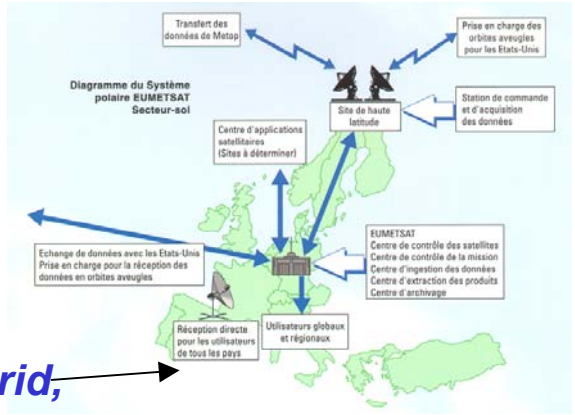


3 Metop satellites





Svalbard Polar Station



EPS Ground Segment including SAFs

Madrid, Back Up Control Centre

3 LEOP services (ESA/ESOC)

14 years of operation

EPS Programme Overview

Launch of 1st Metop ("A"): April 2006

- **following programmatic review, April 2006 specified to launcher authority (Starsem) from original Oct - Dec 2005 window. Agreed by EUMETSAT Council 02-03Dec2004**

Critical path:

- **Ground Segment-> Integration, Verification &Validation-> Launch campaign-> launch**

Sub-Critical path:

- **Space segment -> IASI**

EUMETSAT Polar System (EPS): Metop Satellites

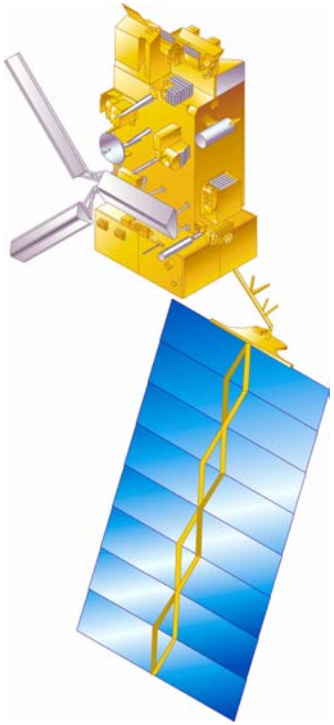
All weather/advanced operational temperature/moisture sounding:
AMSU-A, MHS, HIRS-4, IASI, GRAS

Global visible/IR 1 km resolution imager: AVHRR-3

Ocean surface wind vectors: ASCAT

Ozone monitoring: GOME-2

Launch of 1st Metop: METOP A April 2006

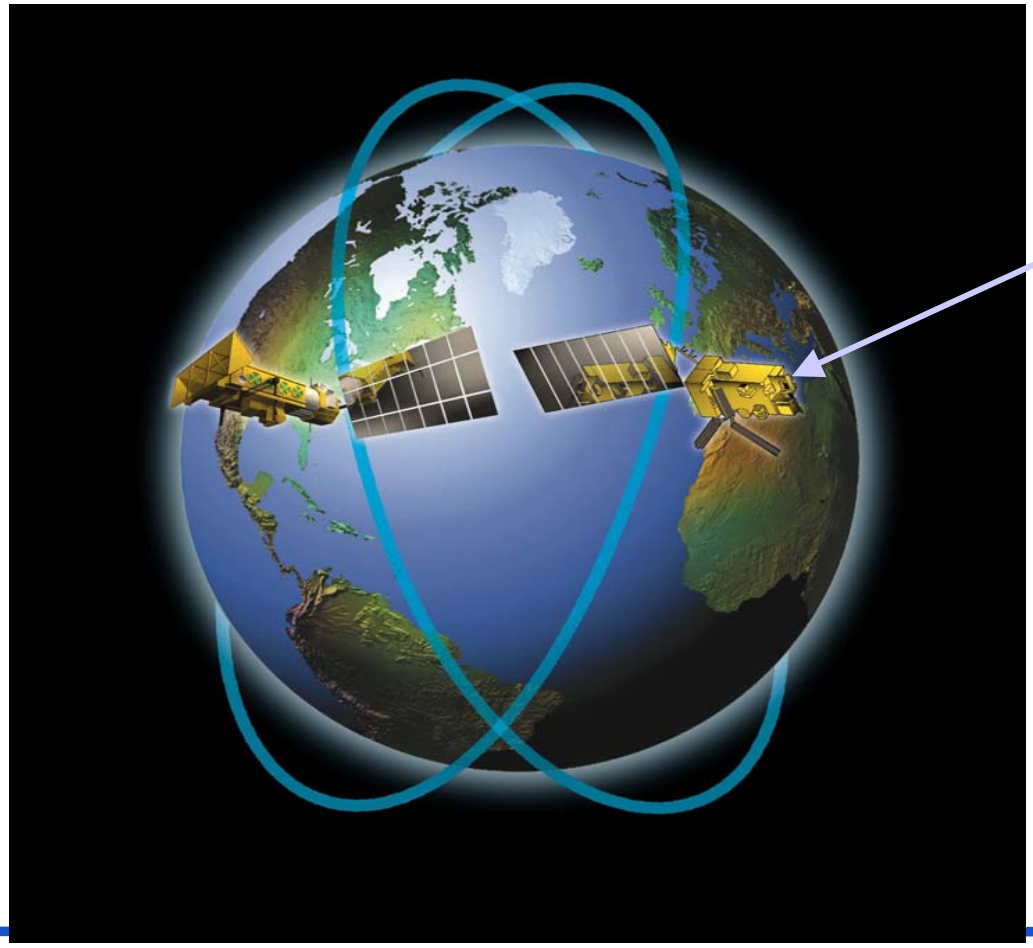


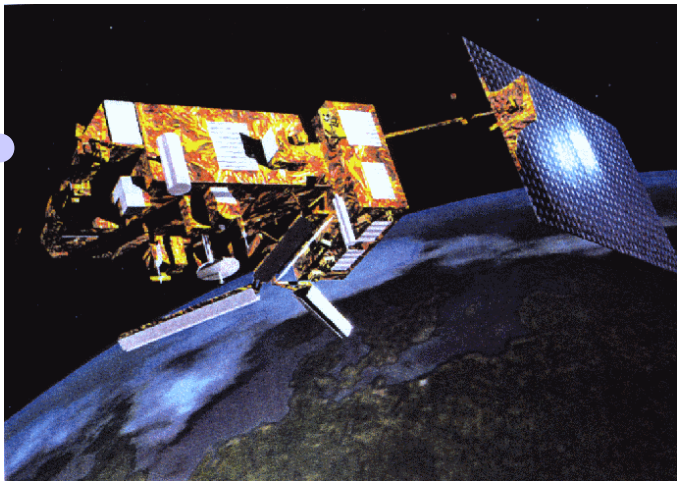
The Metop Satellite

Metop 1 mechanical tests

- Design based on heritage of SPOT-5 & ENVISAT
- 5-year nominal lifetime
- Nominal launch intervals of 4.5 years (6-month overlap)
- Dimensions: 6.3 m x 3.4 m x 3.4 m (launch configuration)
- Launch mass: 4100 kg (instruments: 900Kg)
- Solar array: 11.3 m (length), 3800 W (instruments: 1100W)
- Data flow: 3500 kbps
- Sun Synchronous LEO orbit:
  - 820 km altitude
  - 09.30 MLST (descending)
  - Pointing:< 0.1° typical
- Double compatibility with Soyuz ST & Ariane 5

The EUMETSAT Polar System (EPS): within Initial Joint Polar System (IJPS)





The (3) Metop satellites form the Space segment of the EPS system

EUMETSAT

IJPS Partnership

The Initial Joint Polar System Partnership:

- **EPS comprises 2 Metop satellites, POES NOAA N & N´**
- **EUMETSAT provides dedicated mid-morning orbit sounder**
- **NOAA N/N' & Metop share common instruments: AVHRR, HIRS, MHS, AMSU-A, SEM, ARGOS, S&R**

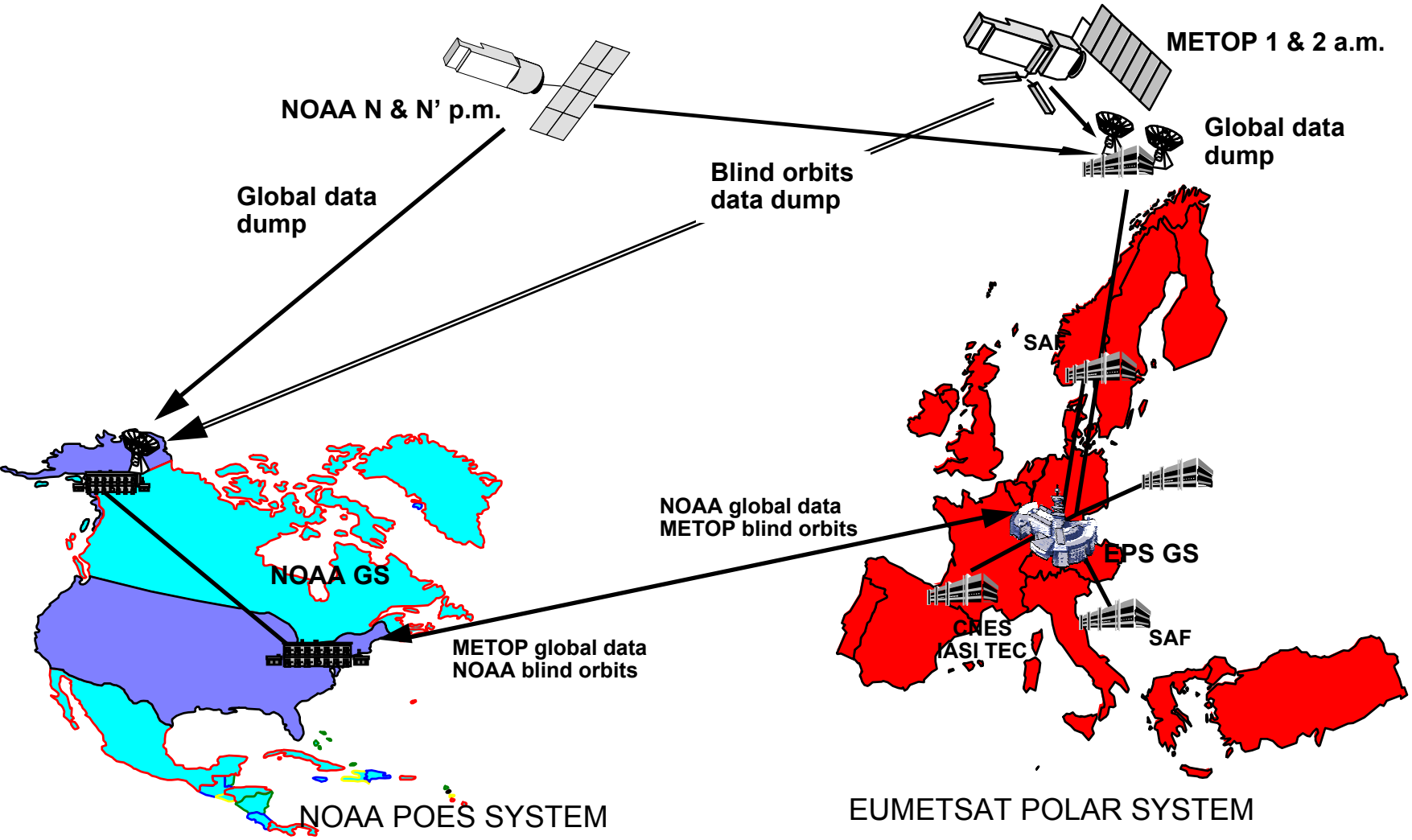
- **Mission Data Exchange**
- **Cross support for blind orbits**
- **Mutual support in case of contingency**
- **Support in the development of products**

Future Joint Polar System Partnership

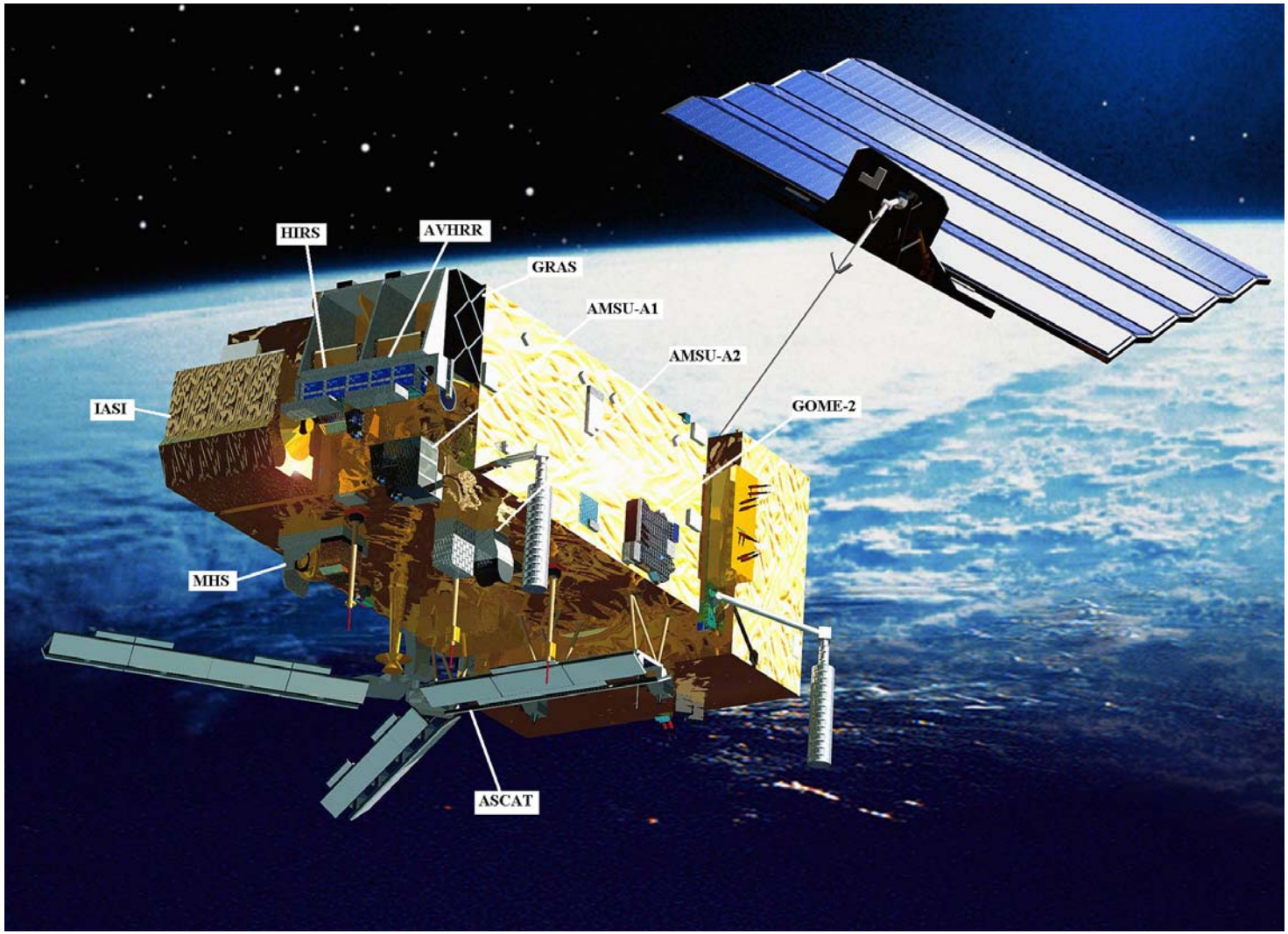
Joint Transition Activity Agreement

- signed in June 2003
- covers NOAA delivery of US instruments for Metop-3 and exchange of Metop-3/NPOESS data
- Future activities leading to a Joint Polar System 2018+ timeframe
- amendment being signed to cover mutually agreed NOAA-N' recovery strategy

EPS within IJPS



The METOP Satellite



Metop Payloads

- 13 instruments (innovative in GREEN)
  - Visible/IR imager (AVHRR/3);
  - Microwave sounders (MHS, AMSU-A1/2 and GRAS)
  - IR sounders: HIRS (not on M-3) and IASI
  - UV sounder (GOME-2)
  - C-band dual swath scatterometer (ASCAT)
  - Data Collection (A-DCS-3 ARGOS)
  - S&R transponders (2) (not on M-3)
  - Space Environment Monitor (not on M-3)
- 2 direct broadcast capabilities:
  - A-High Resolution Picture Transmission (A-HRPT)
  - Low Resolution Picture Transmission (LRPT) at 137 MHz

IASI instrument developed by CNES/EUMETSAT

IASI PFM Instrument on PLM 2 at ESTEC

Mission Objectives:

- Temperature profile: 1K/1km (lower troposphere)
- Relative Humidity: 10%/1 km (lower troposphere)
- Trace gases: O_3 low resolution profile, CH_4, CO columns

Main Characteristics: Michelson interferometer

- High spectral resolution (0.25 cm^{-1} unapodized)
- Spectral range: 3.4 to 15.5 µm
- Radiometric resolution < 0.2 K (NeDT), accuracy < 0.5 K
- Horizontal resolution/sampling: 12km/25km
- Wide swath (2200km) scanning synchronised with AMSU-A
- Built-in imager for co-registration with AVHRR

Metop Instruments

MHS: Instruments delivered

Agreed NOAA N' recovery strategy.

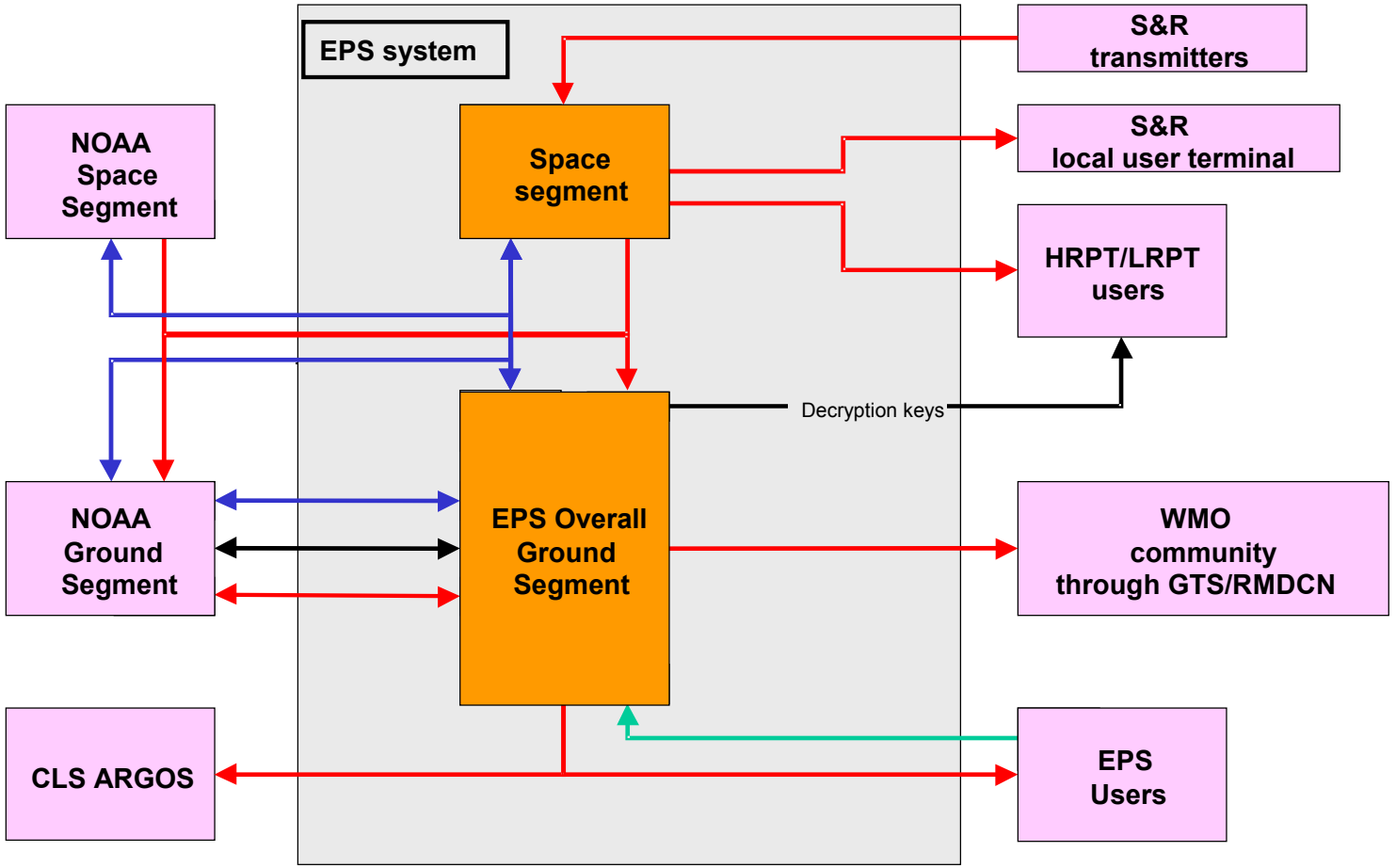
IASI: Detector problems solved, Delta Qualification Review planned for October.

GOME-2: No major issues.

ASCAT: Anomalies found and under investigation, major concern from Metop-1 FAR.

GRAS: No major issues.

The Overall Ground Segment within EPS



EPS Product Services

CGS baseline products include:

- **All level 1 Products from all NOAA & Metop sensors**
- **Selected Level 2 Products: Temperature/Moisture Profiles, Cloud Products...**

Variety of services/level 2 products from 7 SAFs:

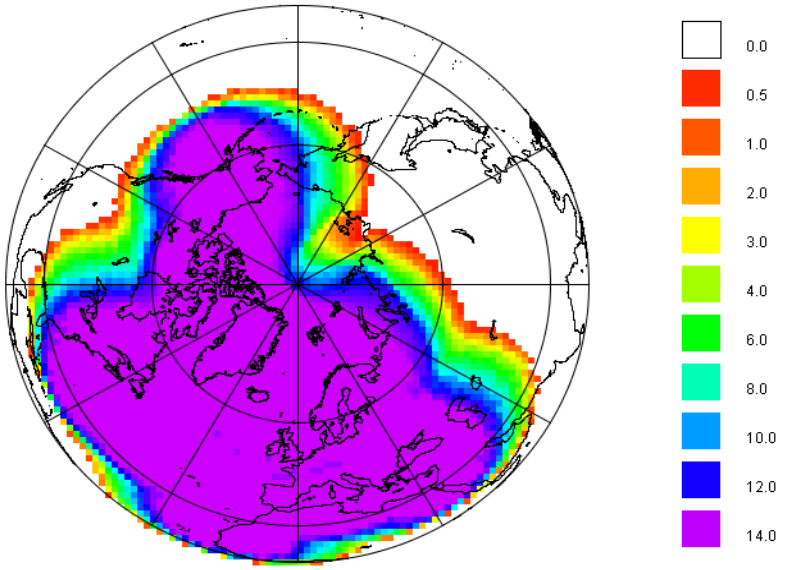
- **Ocean & Sea Ice**
- **Support to nowcasting & VSRF (SW Packages)**
- **Ozone Monitoring**
- **GRAS Meteorology**
- **Climate Monitoring**
- **Land Surface Analysis**
- **Numerical Weather Prediction (NWP)**

EUMETSAT Support to NOAA

EUMETSAT supported NOAA in the relevant NOAA N' recovery options:

- **Cooperative agreement obtained with NOAA on mutual recovery strategy - cost neutral**
- **MHS FM2, had initial nominal functionality, EUMETSAT to conduct re-acceptance tests on MHS FM2, delivery to NOAA November 2005**
  - **funding approval obtained at EUMETSAT Council 56 03Dec2004**
- **NOAA to provide flight ready AVHRR, AMSU-A for Metop-3, supporting/ maintaining AMSU-A from 2010 to mid 2015**

EUMETSAT Services: EARS



The ATOVS retransmission service

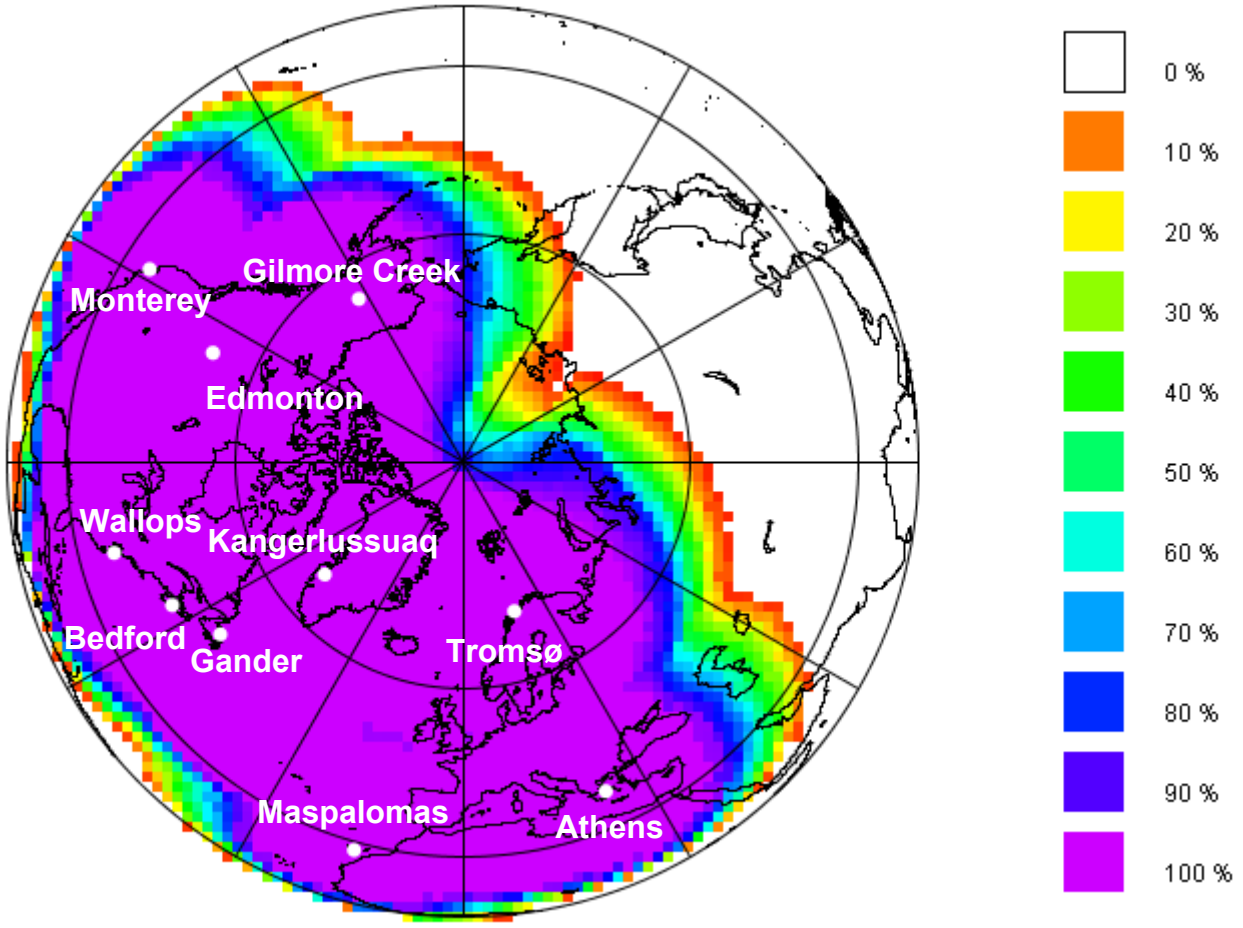
- Acquisition of local ATOVS data from the NOAA satellites
- Pre-processing of the data and dissemination of the raw and pre-processed data via EUMETSAT to the users

10 Stations operational since December 2003.

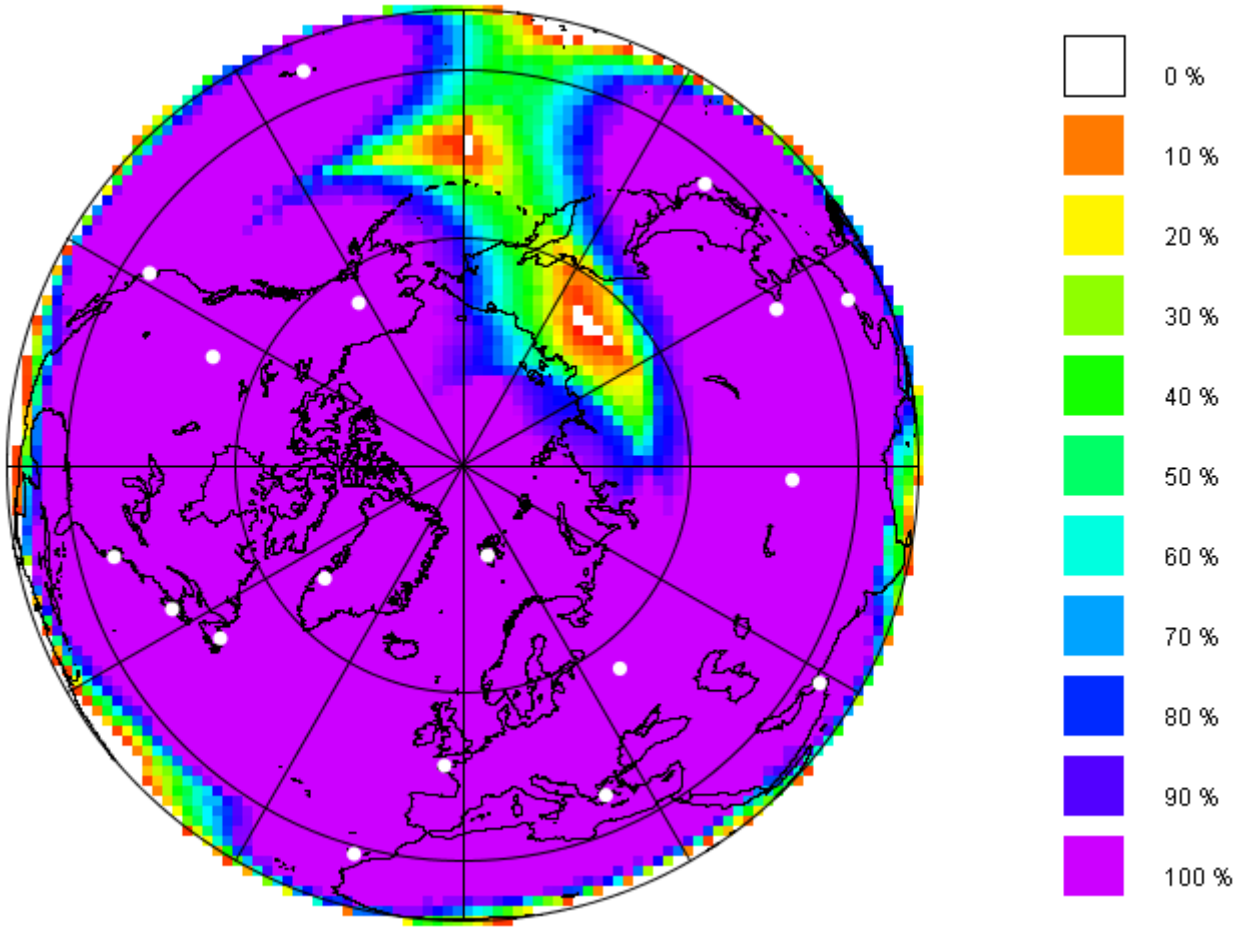
Effectively a "SafetyNet" ™ type approach at a regional level

Dissemination is via EUMETCast, which now also offers MSG data at Ku band in Europe

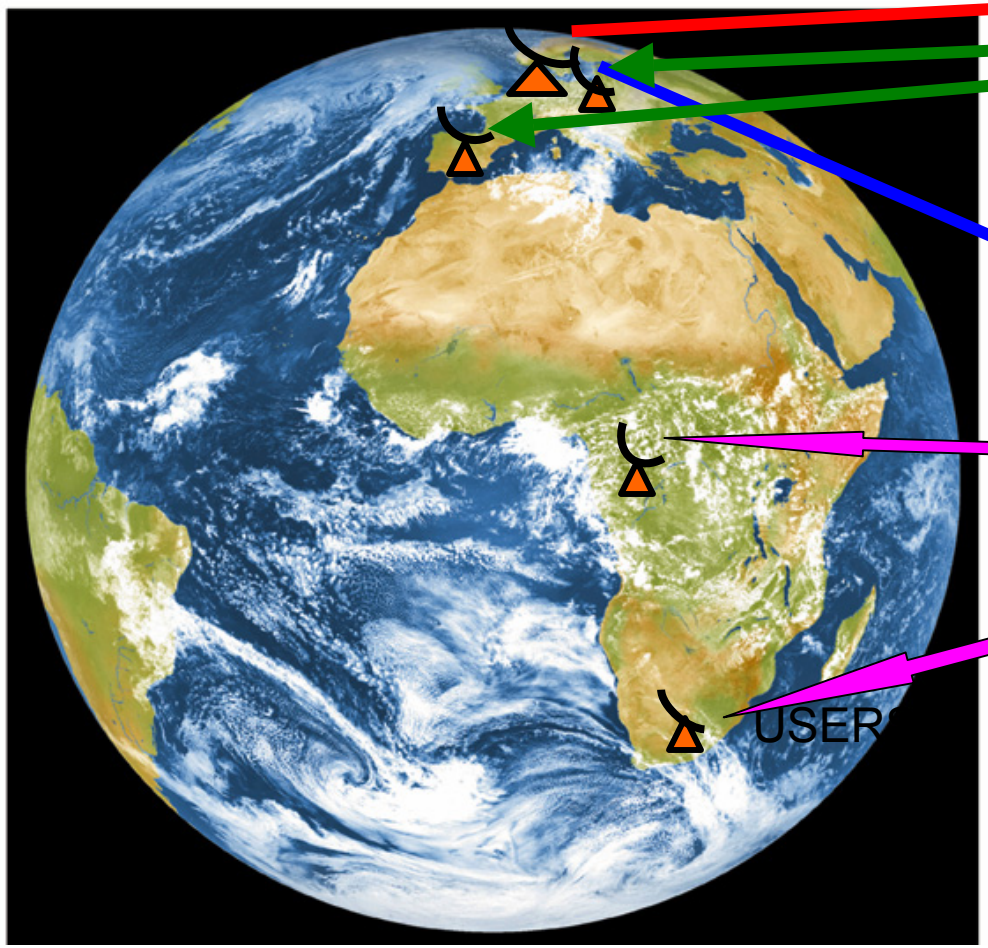
Current EARS Coverage : Gander, Bedford, Wallops, Gilmore Creek



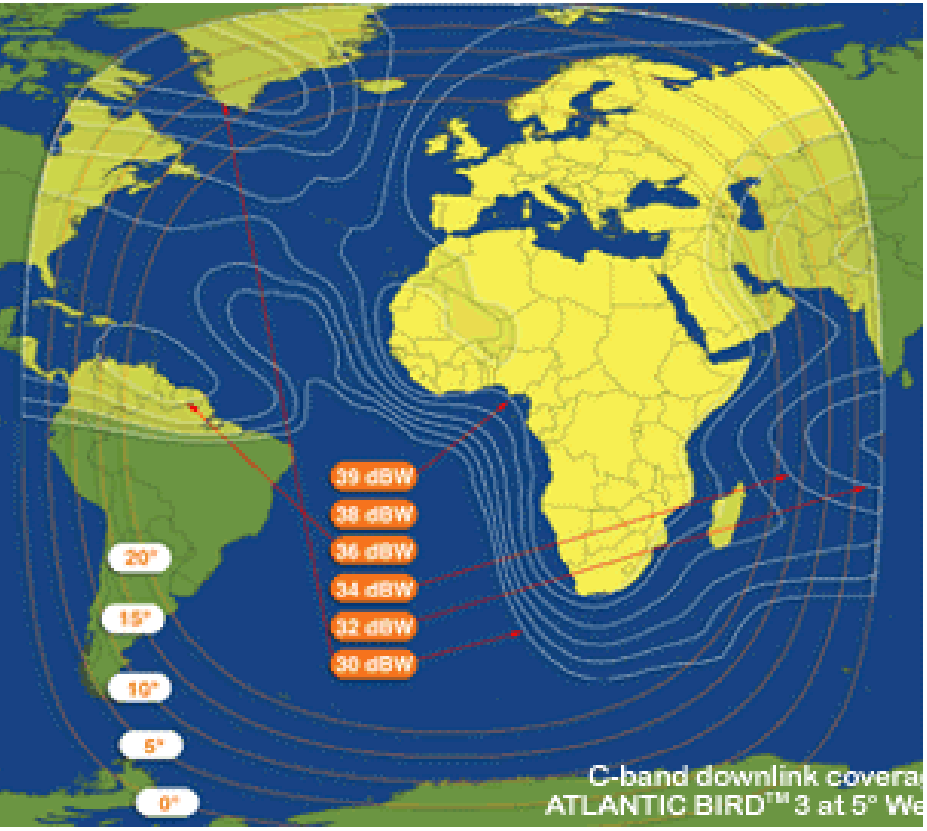
Long Term Goal: Addition of Oman, Russia, Eastern Europe, Svalbard, China, Japan, Hawaii

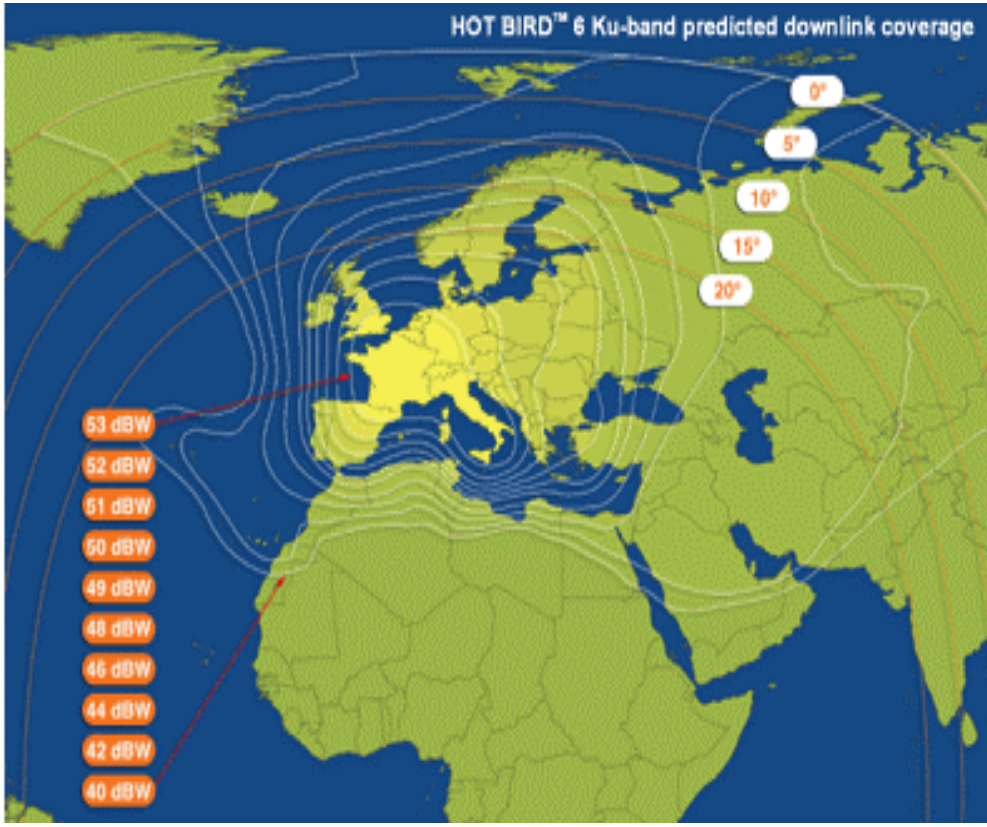


EUMETSAT Services: EUMETCast

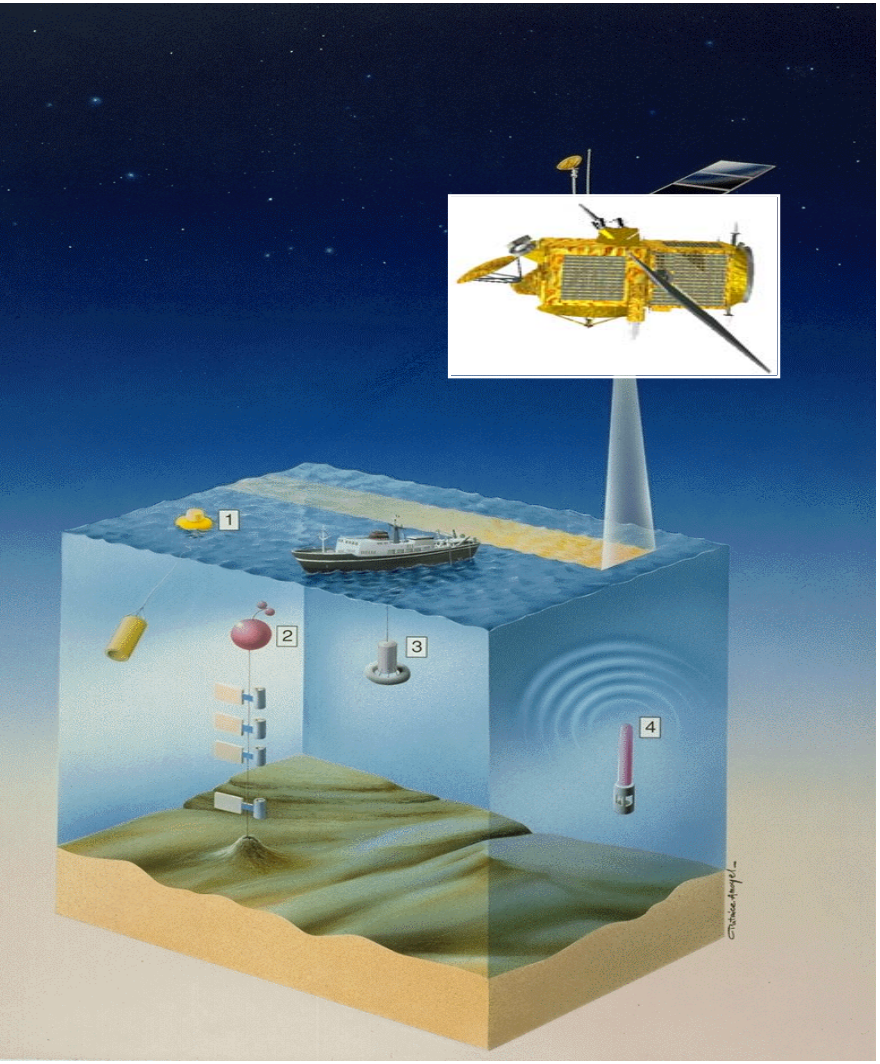


Improved Access to Earth Observation Data: EUMETCast Coverage (C-& KU-band) Services





Jason-2 Programme



Launch April 2008

EUMETSAT one of four partners with CNES, NASA, NOAA.

EUMETSAT role is the European Operational Agency. EUMETSAT will operate an Earth Terminal, receive data, and disseminate rea time data.

EUMETSAT Programme came into force on 27 June 2003, Thus all EUMETSAT funding now guaranteed.

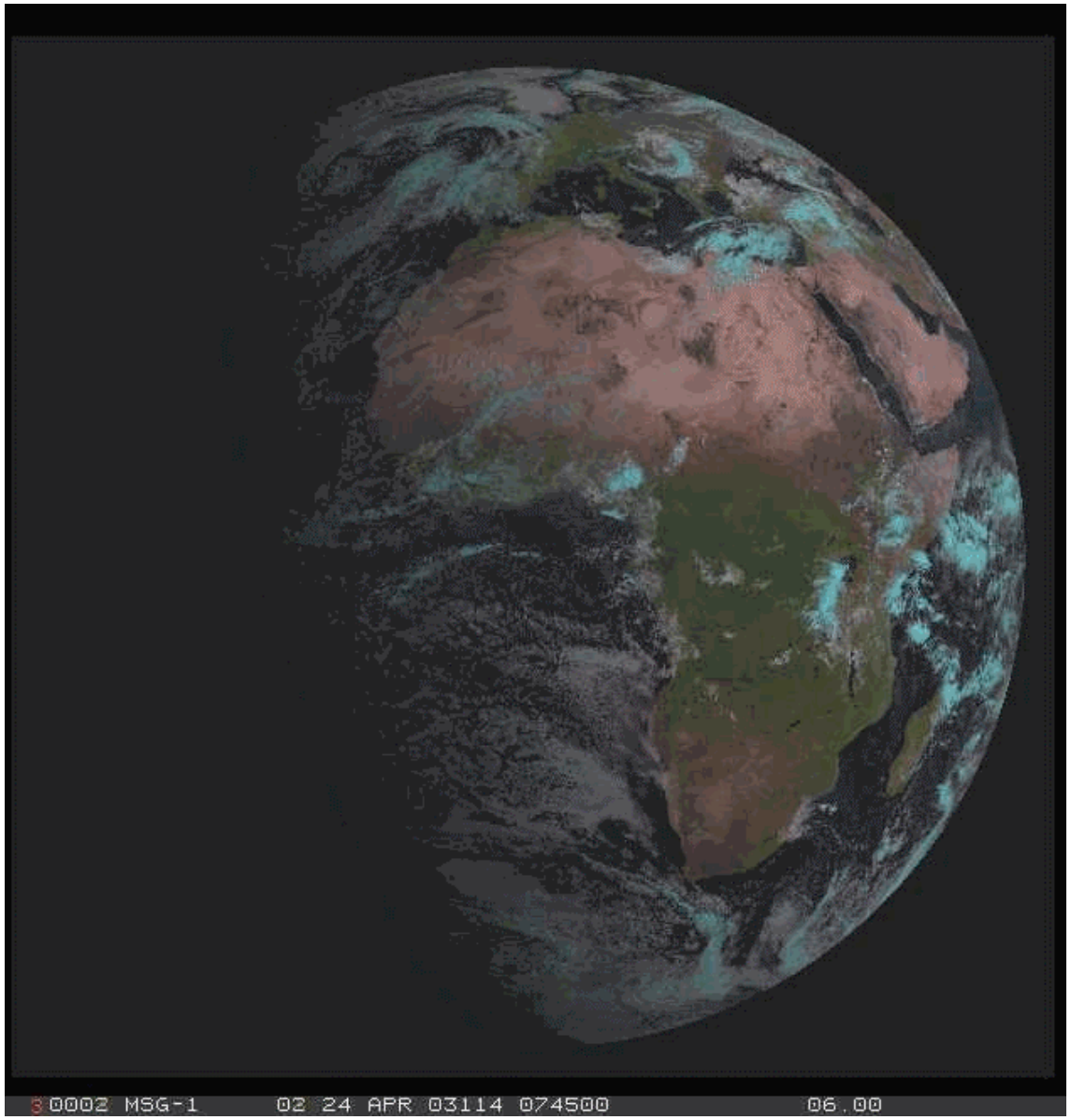
EPS Towards Launch

Metop 1 mechanical tests

IASI PFM Instrument on PLM 2 at ESTEC

IASI integrated on Metop PLM

Metop 2 in integration (2004)



MSG-1 SEVIRI RGB Image

0.6 µm => blue
0.8 µm => green
1.6 µm => red

Thank You

Ref:
www.eumetsat.de